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BULLETIN No. 2.

THE SCOURGE OF THE HOUSE FLY AND HOW TO COMBAT IT

BY

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(ENTOMOLOGICAL SECTION.)

THE NATURE OF THE DAMAGE DONE BY THE PINK BOLL WORM

(*Gelechia gossypiella,* Saund.),

BY

LEWIS GOUGH, Ph.D., F.E.S., etc.,

Director of the Entomological Section.

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PRELIMINARY INVESTIGATION INTO THE NATURE OF THE DAMAGE DONE BY THE PINK BOLL WORM.

In the following paper are embodied the results obtained in an enquiry into the nature of the damage done by the Pink Boll Worm.

The material used was taken from second picking of several varieties of cotton which had been grown in different parts of the Delta. One hundred apparently sound bolls were each time taken, and compared with 100 diseased bolls from the same field. The cotton was taken at the time of picking, in the ordinary way, lint and seed of 100 sound bolls being placed in one envelope, and lint and seed from 100 affected bolls in another. The pickers' instructions were not to take any bolls which would normally be rejected by the harvester, as the object was to ascertain the nature and not the actual amount of damage done to the crop. To ascertain the extent of damage the examination would have to be carried out on other lines.

On receipt of the samples in the laboratory the total weight of lint and seed together was taken. Then the cotton was ginned and the weight of seed and cotton was taken separately. After this the seed was sorted into sound seed and attacked seed. The attacked seed was only such seed as had been damaged by the Pink Boll Worm. After weighing the sound and attacked seeds separately both lots were counted.

The figures thus obtained have been used to deduce the following data :—

Percentage of lint.

Percentage of sound and attacked seeds by number and by weight.

Average number of seeds per boll.

Average weight of a single sound seed.

Finally, sound seeds from affected and sound bolls have been tested for germination.

Although in every case a certain number of the seeds in the sound bolls have been found to be damaged, the number of these in such bolls has rarely exceeded ten per cent ; being usually much lower. The figures given for damaged seeds in the "sound" bolls show how very widespread *Gelechia* has already become.

It appears from a study of the table that the following main conclusions can be drawn as to the nature of the damage :—

(1) The percentage of lint is reduced in the attacked bolls. This result was somewhat unexpected; it was anticipated that the percentage would rise, owing to the reduction in weight of the damaged seeds. As there is very little doubt that the lint remaining is of poorer quality, this makes the total damage to lint still more serious.

(2) There is almost invariably a very considerable reduction in the number of seeds which develop from an attacked boll compared with the number maturing from a sound one. In counting, all recognisable seeds have been enumerated, whether sound, injured, or immature. The reduction in the number of seeds is perhaps due to some of the seeds when yet very small having been entirely consumed by the worm. If this be the case, the average number of seeds in diseased as compared with sound bolls might depend to some extent on the stage the boll had reached before being attacked.

(3) In addition to the reduction in number of seeds per boll there is also a reduction in weight of the sound seeds individually. This reduction is as much as twenty-six per cent in the average of all the seeds in extreme cases.

(4) Not only is the weight of the sound seeds from diseased bolls reduced, but the vitality of such seeds is impaired. The germination of these seeds can fall as low as half that found for seeds from sound bolls. *See* Table II.

(5) Although the percentage of seed has risen considerably it is largely made up of hulls and broken seed.

(6) The amount of lint and of seed present in attacked bolls never reaches the quantity found in the sound, control bolls. The amount actually found in our samples was in the worst case only one-quarter of the control, in the best case only three-quarters.

The nature of the damage done by the Pink Boll Worm can be summarized as being :—

(1) Reduction in number, weight, and vitality of seeds.

(2) Reduction in weight and quality of the lint.

(3) Reduction of percentage of lint (ginning output), with a fall in quality of the seed, the place of some seeds being taken by worthless hulls and broken seed.

With reference to Table I, although the percentage of lint for total seed cotton from damaged bolls shows a diminution of from 0·3 to 12·1 (average 3·9) compared with seed cotton from the sound bolls, under ordinary ginning conditions it would probably be found that the lint from damaged seed cotton would show a larger proportion on the actual output (ginned cotton + bagged seed), as in the process of ginning a large quantity of hollow seed would be lost altogether. Although this does not affect the statements and deductions made in connection with these experiments, it is necessary to point out that the proportionate amount of lint to seed actually marketed might be expected to be increased owing to a Gelechia attack.

All these experiments were, as before stated, conducted with second picking cotton and further experiments on the same lines are therefore desirable with cotton from the first picking, which when completed should serve as a useful assistance for the estimation of the crop.

TABLE I.—**Showing Damage done by *Gelechia* Larv**

VARIETY.	CONDITION.	WHERE GROWN.	100 BOLLS. Weight in Grammes.			% LINT.
			Total.	Seed.	Lint.	
AFFIFI ASSILI	Control good... ...	Héhia 1	236	154	82	34·75
	Moderate		119	78	41	34·45
	Control good... ...	Zagazig... 2	287	192	95	33·10
	Poor		115	81	34	29·57
NUBÂRI	Control good... ...	Gîza 3	260	178	82	31·54
	Hardly damaged ...		183	126	57	31·15
	Control good... ...	Kafr Saqr 4	353	229	124	35·13
	Hardly damaged ...		266	174	92	34·59
	Control good... ...	Bilbeis 5	289	188	101	34·95
	Poor		145	98	47	32·41
	Control good... ...	Zagazig... 6	258	168	90	34·88
	Bad		144	100	44	30·56
	Control good... ...	Mînia el Qamh ... 7	249	152	97	38·96
	Bad		148	95	53	35·81
SAKELLARÎDES	Control good... ...	Hehia 8	229	158	71	31·00
	Bad		84	61	23	27·38
	Control good... ...	Zifta 9	259	172	87	33·59
	Bad		154	115	39	25·32
	Control good... ...	Qallin 10	221	156	65	29·41
	Bad		98	81	17	17·35

n Cotton Bolls (Second Picking).

100 Bolls. Number of Seeds.					1 Boll. Average Number of Seeds.	100 Bolls. Weight of Seeds in Grammes.					1 Sound Seed. Average Weight in Grammes.
Total.	Sound.	Damaged.	% Sound.	Reduction due to Attack.		Total.	Sound.	Damaged.	% Sound.	Loss.	
1,492	1,400	92	93·8	—	15	151	149	5	96·8	—	0·106
1,151	381	770	33·1	341	11-12	78	33	45	42·3	76	0·087
1,667	1,620	47	97·2	—	16-17	192	187	5	97·4	—	0·115
1,085	285	800	26·3	582	10-11	81	27	54	33·3	111	0·095
1,813	1,760	53	97·1	—	18	178	175	3	98·3	—	0·099
1,575	1,133	442	71·9	238	15-16	126	96	30	76·2	52	0·085
2,120	2,050	70	96·7	—	21	229	223	6	97·4	—	0·109
1,876	1,613	263	86·0	244	18-19	174	155	19	89·1	55	0·096
1,770	1,718	52	97·1	—	17-18	188	186	2	98·9	—	0·108
1,405	305	1,100	21·7	365	14	98	27	71	27·6	90	0·089
1,599	1,427	172	89·2	—	16	168	154	14	91·7	—	0·108
1,650	150	1,500	9·1	—51	16-17	100	13	87	13·0	68	0·087
1,740	1,634	106	93·9	—	17-18	152	147	5	96·7	—	0·090
1,195	805	390	67·4	545	12	95	71	24	74·7	57	0·088
1,547	1,460	87	94·4	—	15-16	158	151	7	95·6	—	0·103
975	105	870	10·8	572	9-10	61	8	53	13·1	97	0·076
1,579	1,413	166	89·5	—	15-16	172	158	14	91·9	—	0·112
1,486	572	914	38·5	93	14-15	115	49	66	42·6	57	0·086
1,710	1,485	225	86·8	—	17	156	137	19	87·8	—	0·092
999	160	839	16·0	711	10	81	12	69	14·8	75	0·075

TABLE II.—**Comparative Germination of whole Seeds from Bolls which have been attacked by *Gelechia* Larvæ compared with whole Seeds from unattacked Bolls.—Germinated at 37°.**

VARIETY.	WHERE FROM.	SEEDS FROM SOUND BOLLS.			SEEDS FROM DAMAGED BOLLS.			REMARKS.
		Germinate.	Fail.	% Germinate.	Germinate.	Fail.	% Germinate.	
NUBARI	Zagazig	40	5	89	13	22	37	For the purposes of this examination selected whole undamaged seed was used. The deficiency of germination in the seeds from the damaged bolls is not due to the seeds having been perforated by worms, but to lowered vitality.
		39	2	95	16	17	48	
	Minia el Qamh.	54	38	59	20	30	40	
		42	43	49	18	24	43	
SAKELLARIDES...	Qallin	30	7	81	23	28	45	
		30	5	86	17	15	53	
	Zifta	27	15	64	18	18	50	
		28	15	65	13	18	42	

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